

**CLAIMS**

What is claimed is:

1. A method for coupling an optical connector to optoelectronic devices, comprising:

5 providing an optical connector which houses an array of optical fibers fixed into relative position along a first plane, an optical subassembly (OSA) base including a first weldable surface, and a substrate assembly including a second weldable surface and an array of optoelectronic devices fixed along a second plane;

10 mechanically coupling said optical connector to said OSA base to form a first component, such that relative motion of said optical connector with respect to said OSA base is generally prevented along said first plane;

15 engaging said substrate assembly with said first component such that said first plane and said second plane are substantially parallel and such that said substrate assembly is generally free to move with respect to said first component along said second plane, said second weldable surface contacting said first weldable surface and being moveable with respect thereto;

20 aligning said array of optoelectronic devices to said corresponding array of optical fibers by providing relative translational motion between said first weldable surface and said second weldable surface to determine when a preferred alignment position is achieved; and,

fixing said first weldable surface to said second weldable surface.

2. The method as in claim 1, wherein said fixing said first weldable surface to said second weldable surface comprises laser welding.

25 3. The method as in claim 1, in which said optical connector is an optical ferrule.

30 4. The method as in claim 1, in which said alignment step includes said relative translational motion being restricted by mechanical stops formed on at least one of said substrate assembly and said OSA base.

5. The method as in claim 1, in which said alignment step includes powering said optoelectronic devices to emit light and monitoring optical strength along said optical fibers.

5 6. The method as in claim 1, in which said optoelectronic devices are photodetectors and said alignment step includes illuminating said optical fibers and monitoring output signals from said photodetectors.

7. A method for coupling an optical connector to optoelectronic devices,  
10 comprising:

providing an optical connector which houses an array of optical fibers fixed into relative position along a first plane, and an optical subassembly (OSA) base including an array of optoelectronic devices fixed along a second plane of a substrate;

15 loosely engaging said OSA base with said optical connector such that said first plane and said second plane are substantially parallel and said optical connector is allowed restricted motion with respect to said OSA base along said second plane;

aligning said array of optical fibers to said corresponding array of optoelectronic devices by providing relative translational motion between said optical connector and said OSA base to determine when a preferred alignment position is  
20 achieved; and,

fixing said optical connector with respect to said OSA base.

8. The method of claim 7, in which said aligning step includes said relative translational motion being restricted by mechanical features formed on at least one of  
25 said optical connector and said OSA base.

9. An apparatus comprising a substrate assembly including a semiconductor substrate having an optoelectronic light-emitting device disposed on a top surface thereof and a photodetector device disposed below a bottom surface thereof and capable of  
30 detecting light emitted by said optoelectronic device, wherein said semiconductor

substrate includes a pass through portion which permits light emitted by said optoelectronic device to pass through.

10. The apparatus as in claim 9, further comprising a further semiconductor  
5 substrate interposed between said semiconductor substrate and said photodetector, said further semiconductor substrate being transparent to said light emitted by said optoelectronic device.

11. The apparatus as in claim 10, in which said optoelectronic device  
10 comprises a vertical cavity surface emitting laser and said photodetector is formed on said substrate assembly beneath an overhang portion of said semiconductor substrate and said further semiconductor substrate.

12. The apparatus as in claim 9, in which said light emitted by said  
15 optoelectronic device includes a wavelength being at least 1.25 microns.

13. The apparatus as in claim 9, wherein said pass through portion comprises  
at least one of a transparent material or a notch.

14. An optical subassembly module comprising a base unit having a pair of  
20 guide pins passing through a substrate assembly and a ferrule, said substrate assembly includes a VCSEL array and a photodiode, wherein said photodiode is capable of detecting a light wavelength emitted by said VCSEL array, and wherein said conventional ferrule is spaced apart from said VCSEL array by a medium that is  
25 transparent to said light wavelength.

15. The optical subassembly module of claim 14, wherein said medium is at  
least one of an epoxy layer, a flip chip lens, and a lens array.

16. The optical subassembly module of claim 14, further comprising a  
30 connector latch in mechanical communication with said base unit.

17. The optical subassembly module of claim 14, wherein said substrate assembly comprises a ceramic substrate and a weld plate, and wherein at least one of said ceramic substrate and said weld plate includes notch to permit light from said VCSEL array to pass through.

18. The optical subassembly module of claim 14, further comprising a lens frame and an adjustable stop member, said adjustable stop member is configured to adjust a gap between said conventional ferrule and a lens array.

19. The optical subassembly module of claim 14, further comprising a VCSEL frame and wherein said VCSEL frame includes a recess for receiving said VCSEL array.

20. The optical subassembly module of claim 14, further comprising a ceramic substrate assembly disposed between said VCSEL array and said photodiode.